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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,214	02/18/2004	Hitoshi Kitagawa	ALPSP140	5339

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EXAMINER

LEPISTO, RYAN A

ART UNIT	PAPER NUMBER
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2883

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/782,214

Applicant(s)

KITAGAWA, HITOSHI

Examiner

Ryan Lepisto

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-15 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 18 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/04, 4/05.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. **Claims 8-9 and 11-15** are rejected under 35 U.S.C. 102(e) as being anticipated by **Fukshima et al (US 2002/0135863 A1)** (Fukshima). Fukshima teaches a light deflector (Figs. 1A, 2A-B, 16) comprising a photonic crystal (1) having a first periodic array of cylindrical dielectric members (Fig. 2A, 1d) with a first refractive index (materials can include LiNbO₃, BaTiO₃ or NH₄H₂PO₄, paragraph 0052) and a second array of dielectric members (spaces between 1d, or cylindrical air holes as shown in Fig. 2B surrounding by the first dielectric member) with a second, different refractive index wherein the refractive angle of incoming light (not normal to the dispersion surface) changes in response to an electric field applied to the crystal (1) in a direction across the thinnest portion of the crystal that changes the first dielectric members (1d) refractive index/dielectric constant (paragraphs 0038, 0049-0050), all together forming a bandgap structure corresponding to light of a predetermined wavelength (paragraph 0039)

Fukshima further teaches an array of the photonic crystal members (Fig. 16, 1) wherein each photonic crystal has a first and second dielectric member as described above (wherein the second crystal has two dielectric members with different dielectric constants and refractive indices that can be considered third and fourth members) that also is affected by an applied electric field. In this configuration some signals are passed through a particular crystals so these particular crystals are being photonic waveguides since they are photonic and are guiding a light wave, while others will deflect a signal.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-7 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukshima as applied to claims 8-9 and 11-15 above, and further in view of the references number C1 in the Form PTO-1449 filed on 28 April 2005 titled "Photonic Crystal Light Deflection Devices Using the Superprism Effect" (C1).

Fukshima teaches the photonic structure described above. Fukshima further teaches that the structure is utilizing the super prism effect (paragraph 0045) wherein an incident light beam can be deflected at wide angles (increases by about 50 degrees).

Fukshima also teaches identical crystal structures as the applicant (the material described above as the first member and air as the second).

Fukshima does not teach expressly the change in refractive angle in response to the change in unit refractive index of the material is 10^3 degrees or more.

The C1 reference teaches further teaches about the super prism effect and how applying an electric field (and therefore making small changes to the dielectric constant and refractive index) to such a structure as taught by Fukshima would result in large refraction angles with a corresponding small overall change in refractive index.

Fukshima and C1 are analogous art because they are from the same field of endeavor, photonic crystals using the super prism effect.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to the structure taught by Fukshima and further explained by C1 would result in a change in refractive angle in response to the change in unit refractive index of the material is 10^3 degrees or more.

The motivation for doing so would have been to reduce size and therefore cost by being able to create large refraction angles that allows for more compact devices.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are pertinent to the state of the art: Koops (US 6,064,506), Lin et al (US 2001/0012149 A1), Sekine et al (US 2001/0026659 A1), Baba et al (US 2002/0041425 A1), Chowdhury et al (US 6,433,919 B1), Hamada

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(US 2002/0110306 A1), Iwasaki et al (US 2002/01909134 A1), Fukushima et al (US 2002/0135863), Shirane et al (US 2002/0146196 A1); Hutchinson et al (US 2003/0039446 A1), Hamada (US 2003/0053352 A1), Miller et al (US 6,542,654 B1), Kitagawa et al (US 2003/0128949 A1), Kittaka et al (US 2003/0142385 A1), Lee et al (US 2003/0202764 A1), Zoorob (US 2004/0001665 A1), Nathan et al (US 2004/0021193 A1), Feisst et al (US 2004/0069948 A1), Parker et al (US 6,735,368 B2), Pearsall (US 2004/0150873 A1), Aoki et al (US 2004/0184752 A1), Hamada (US 6,813,399 B2), Fukushima et al (US 6,822,784 B2), Sakai et al (US 2005/0002605 A1), Fukushima et al (US 2005/0030611 A1), Hamann et al (US 2005/0084213 A1), Baumberg et al (US 6,888,994 B2).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan Lepisto whose telephone number is (571) 272-1946. The examiner can normally be reached on M-F 7:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ryan Lepisto

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Date: 8/11/05



Frank Font

Supervisory Patent Examiner

Technology Center 2800